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AMSAT NEWS SERVICE
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The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT, the Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in Space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on http://www.amsat.org publishes news of Amateur Radio in Space as soon as our volunteers can post it.

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ANS-267 AMSAT News Service Weekly Bulletins

To: All RADIO AMATEURS
From: Radio Amateur Satellite Corporation
712 H Street NE, Suite 1653
Washington, DC 20002

DATE 2023 September 24

2023 AMSAT Symposium Keynote Speakers Announced

Bob Twiggs, KE6QMD, considered to be the “father” of the CubeSat form factor, will be a keynote speaker at the 41st Annual AMSAT Space Symposium and Annual General Meeting banquet.

Bob is a retired professor of Astronautics and Space Science at Morehead State University. He is responsible, along with Jordi Puig-Suari of California Polytechnic State University, for co-inventing the CubeSat reference design for miniaturized satellites which became an industry standard for design and deployment of the satellites.

Twiggs earned a Bachelor of Science in Electrical and Electronics Engineering from the University of Idaho in 1961 and a Master of Science in Electrical Engineering with a concentration in microwave devices from Stanford University in 1964.

>From 1985 to 1994, Twiggs was the director of the Weber State University Center for Aerospace Technology. He served as a consulting professor in the Stanford University Department of Aeronautics and Astronautics from 1994 to 2008. At Stanford, he established the Space Systems Development

Laboratory. Bob Twiggs became a professor at Morehead State University in 2009 in an effort to push the PocketQube standard leveraging the university's large aperture (21m) space tracking system, and to help develop a space economy in the state of Kentucky.

In 2019, Twiggs designed and proposed another smaller, simpler satellite form factor called ThinSat which could enable high school students to design and build satellites.

Joining Bob in the presentation will be Nick Pugh, K5QXJ. A native of Lafayette, Louisiana, Nick is credited with establishing the first microwave loop in the Gulf of Mexico just two years after his graduation from University of Southwestern Louisiana (now the University of Louisiana at Lafayette). His pioneering leadership with telecommunications technology in and around the Gulf of Mexico over the years has spurred regional economic development.

Nick is also a longtime community volunteer. He directed University of Louisiana Lafayette's successful effort to become the first college team in Louisiana to build and launch satellites. He also advised the David Thibodaux STEM Magnet Academy's high school student team, which placed a biological experiment on the International Space Station. Nick is also a member of the Acadiana Area Radio Association and the Lafayette Computer Club, and a founding member of Acadiana Open Channel.

Nick has served as chair of Habitat for Humanity Lafayette. He was a member of Leadership Lafayette Class XXVII and is a 1998 graduate of Harvard's Owner/President Management program. He is also the founder of the Pugh Family Foundation, a philanthropic venture focused on helping to create a world-class public education system in the Acadiana region.

[ANS thanks AMSAT and Wikipedia for the above information.]

41st Annual AMSAT Space Symposium Call for Papers

Papers are now being accepted for the 41st annual AMSAT Space Symposium to be held on the weekend of October 20-21, 2023 at the Sheraton DFW Airport in Dallas/Fort Worth, Texas.

Proposals for Symposium papers and presentations are invited on any topic of interest to the amateur satellite community. We request a tentative title of your presentation as soon as possible, with final copy submitted by October 12 for inclusion in the symposium proceedings. Abstracts and papers should be sent to Dan Schultz, N8FGV at n8fgv at amsat.org.

[ANS thanks Dan Schultz, N8FGV, AMSAT Symposium Proceedings Editor, for the above information]

Russian Soyuz MS-24 Launches Crew to International Space Station

Russian spacecraft Soyuz MS-24, carrying two Russian cosmonauts and a U.S. astronaut, successfully blasted off from the Baikonur Cosmodrome in Kazakhstan on Friday, September 15th, with live TV footage capturing the launch. This mission marked the 85th launch of the Soyuz 2.1a in 2023 and the 6th launch from the Baikonur Cosmodrome in the same year, contributing to the 149th orbital launch attempt of 2023.

The Soyuz MS-24 mission, also known as Expedition 70/71, had initially been scheduled for March 16, 2023. However, due to technical issues with the docked Soyuz MS-22 spacecraft, the crewed mission was reassigned to Soyuz MS-24. The spacecraft, designated Soyuz MS-24, carried American astronaut Loral O'Hara along with Russian cosmonauts Oleg Kononenko and Nikolai Chub.

The mission launched under the auspices of the Russian space agency, ROSCOSMOS, utilizing the Soyuz 2.1a launch vehicle. The lift-off took place from Launch Complex 31/6 at the Baikonur Cosmodrome. The spacecraft's destination was the International Space Station (ISS), situated in a low Earth orbit approximately 400 kilometers above Earth's surface at a 51.66° inclination.

The crew of Soyuz MS-24, upon reaching the ISS, would join the existing station crew members, which included NASA astronauts Frank Rubio and Jasmin Moghbeli, KI5WSL, Russian cosmonauts Dmitry Petelin, Konstantin Borisov, Sergei Prokopyev, as well as Denmark's Andreas Mogensen, KG5GCZ, and Japan's Satoshi Furukawa, KE5DAW.

The Soyuz MS-24 crew was composed of Commander Oleg Kononenko, Flight Engineer 1 Nikolai Chub from ROSCOSMOS, and Flight Engineer 2 Loral O'Hara from NASA. Commander Oleg Kononenko, RN3DX, had previously completed four spaceflights and accumulated 916 days in space, exceeding the previous record of 878 days held by Gennady Padalka.

Nikolai Chub, on the other hand, was embarking on his first journey to space as Flight Engineer 1, having been selected as a Roscosmos cosmonaut in 2012. Loral O'Hara, KI5TOM, Flight Engineer 2, was an astronaut candidate with NASA's 2017 Astronaut Candidate Class, making Soyuz MS-24 her maiden spaceflight.

Soyuz, introduced in 1966, has long served as the multi-use medium-lift launch vehicle for the Soviet/Russian space program. Its versatile capabilities encompass launching civilian and military satellites, cargo, and crewed missions to the ISS. The Soyuz-2 rocket stands approximately 46.3 meters tall, with a diameter of 2.95 meters, and a total lift-off mass of about 312,000 kilograms. Its payload capacity to low-Earth orbit ranges from 6,600 to 7,400 kilograms.

The Soyuz MS spacecraft, in this case, Soyuz MS-24, is the latest iteration of Russia's renowned three-person spacecraft. Although its external appearance has remained relatively consistent since its first flight in the 1960s, internal systems and capabilities have been modernized over time.

The spacecraft consists of three sections: the orbital module, the descent module, and the service module. The orbital module is where the crew primarily resides while in orbit and docks with the ISS. The descent module is the section that returns to Earth intact, carrying the crew during launch and reentry. The service module houses the main engine for orbital maneuvers, thrusters for docking, and life support systems.

The Soyuz MS-24 mission docked with the ISS approximately three hours and 15 minutes after liftoff, adding to the station's international crew and enabling further scientific research in the unique environment of space.

[ANS thanks Mariia Kiseleva, writing for Everyday Astronaut for the above information]

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Water, known for its non-explosive and non-flammable properties, is utilized as the propellant of choice. An onboard electric current induces electrolysis within the thruster, breaking down the water into hydrogen and oxygen. These gases are then fed into the combustion chamber, where they ignite, producing the necessary thrust to maneuver the CubeSat.

This utilization of water as propellant not only aligns with sustainability goals but also reduces overall payload requirements. The absence of the need for pressurization in storing the propellant streamlines storage and handling systems, making them lighter and more straightforward. However, the challenge lay in fabricating the combustion chamber and nozzle for the thruster, a task that required adopting a technique akin to microelectronics. The researchers utilized Micro-Electrical Mechanical Systems (MEMS) techniques, typically used for machining silicon wafers for processors to sub-micrometer tolerances.

The successful testing of the ICE-Cube Thruster was conducted through an ESA General Support Technology Programme De-Risk activity, validating its feasibility in a controlled laboratory environment. The data acquired during this testing phase will serve as a vital guide in the development of a flight-representative "Engineering Model" of the propulsion system, including the electrolyser. This development is slated to be led by URA Thrusters in collaboration with Imperial College.

[ANS thanks the European Space Agency for the above information]

GOES-U Successfully Completes Environmental Testing for 2024 Launch

NOAA's upcoming satellite, GOES-U, the final addition to the GOES-R Series of advanced geostationary satellites, has completed a rigorous battery of tests to ensure its readiness for the challenges of launch and its mission in space. The year-long testing process concluded with GOES-U proving its resilience to the harsh conditions of space, situated 22,236 miles above Earth.

The testing regimen, which commenced in November 2022, involved subjecting GOES-U to extreme temperatures ranging from a scorching 188 degrees Fahrenheit (87 degrees Celsius) to a bone-chilling minus 67 degrees Fahrenheit (minus 55 degrees Celsius). This thermal vacuum testing aimed to simulate the harsh temperature fluctuations during both launch and its mission in the space environment.

Following this, in February 2023, the satellite underwent vibration testing to ensure its structural integrity during the stresses of launch. It then faced the intense sounds of 138.4 decibels during acoustic testing, replicating the noise levels experienced during launch.

March 2023 witnessed the successful completion of shock testing, confirming GOES-U's ability to withstand the separation from the launch vehicle and the deployment of its solar panels. Subsequently, in August 2023, electromagnetic interference and compatibility (EMI/EMC) testing ensured that the satellite's operations would remain unaffected by various forms of electromagnetic radiation.

Notably, GOES-U's large five-panel solar array, initially folded during launch, was verified to deploy correctly upon reaching geostationary orbit. These solar panels will serve as the primary source of power, converting sunlight into electricity to operate the satellite's instruments, computers, data processors, sensors, and telecommunications equipment.

The exhaustive testing program was conducted at Lockheed Martin's facility in Littleton, Colorado, where GOES-U was built. Simultaneously, as the satellite was being prepared for the rigors of launch and space, the GOES-U mission operations team engaged in critical rehearsals to test launch procedures and communication systems between the satellite and ground facilities.

These rehearsals encompassed a wide range of scenarios, including normal operations and contingency procedures in case of unexpected events. The team also conducted tests for compatibility with the Compact Coronagraph-1 (CCOR-1) instrument, which will monitor the sun's corona as part of NOAA's Space Weather Follow-On mission.

GOES-U remains on schedule for its planned April 2024 launch from Cape Canaveral Space Force Station in Florida, utilizing a Falcon Heavy launch vehicle. Following its successful journey to geostationary orbit, it will be renamed GOES-19 and undergo a series of on-orbit instrument and systems checkouts, followed by the validation of its data products.

The GOES-R Series is hailed as the Western Hemisphere's most advanced weather and environmental monitoring system. Comprising four satellites, the program includes GOES-R (GOES-16), GOES-S (GOES-17), GOES-T (GOES-18), and GOES-U. These satellites play a pivotal role in providing crucial data for weather forecasts, environmental hazard detection, and monitoring solar activity and space weather.

The GOES-R Series is set to operate into the 2030s. In parallel, NOAA and NASA are collaboratively working on the Geostationary Extended Observations (GeoXO) mission, ushering in the next generation of geostationary satellites to address future environmental challenges for U.S. weather, ocean, and climate operations. This collaborative effort between NOAA and NASA continues to advance environmental monitoring and scientific research from space.

[ANS thanks NASA’s Goddard Space Flight Center for the above information]

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The Copernicus Sentinel-1 mission's radar capabilities allow scientists to observe and analyze the precise effects of earthquakes on the land surface. This information is crucial for post-disaster restoration efforts.

As Morocco works toward recovery, international space agencies and initiatives like the International Charter, alongside satellite missions such as Sentinel-1, are playing a crucial role in easing the burden on emergency responders and advancing our understanding of seismic events. These efforts contribute significantly to global disaster mitigation.

[ANS thanks the European Space Agency for the above information]

Satellite Top 100 Rovers September 2023 Rankings

The September 2023 rankings for the Top 100 Rovers (Mixed LEO/MEO/GEO) in satellite operations, as determined by @GridMasterMap on Twitter, has been released. The ranking is determined by the number of grids and DXCC entities activated, taking into account only those grids where a minimum number of QSOs logged on the gridmaster.fr website have been validated by a third party. Grid numbers do not directly reflect the exact number of activations. Satellite operators are encouraged to upload their LoTW satellite contacts to https://gridmaster.fr in order to provide more accurate data.

Updated: 2023-09-08

1	ND9M	26	KE4AL	51	OE3SEU	76	DF2ET
2	NJ7H	27	LU5ILA	52	KE9AJ	77	N0TEL
3	N5UC	28	VE3HLS	53	VE1CWJ	78	KB2YSI
4	JA9KRO	29	KI7UNJ	54	JL3RNZ	79	KJ7NDY
5	DL6AP	30	KB5FHK	55	KM4LAO	80	CU2ZG
6	HA3FOK	31	LA9XGA	56	N4UFO	81	VE6WK
7	N9IP	32	N7AGF	57	VA7LM	82	VK5DG
8	WY7AA	33	XE3DX	58	N8RO	83	VE7PTN
9	WI7P	34	N6DNM	59	SM3NRY	84	AF5CC
10	N6UA	35	F4BKV	60	FG8OJ	85	YU0W
11	AD0DX	36	DL2GRC	61	PT2AP	86	W1AW
12	W5PFG	37	KE0PBR	62	AA8CH	87	PT9ST
13	DP0POL	38	K7TAB	63	AM1SAT	88	DK9JC
14	K5ZM	39	KE0WPA	64	F5VMJ	89	VO2AC
15	AD0HJ	40	W7WGC	65	KI7QEK	90	W8LR
16	AK8CW	41	JO2ASQ	66	VE1VOX	91	DL4EA
17	WD9EWK	42	EA4NF	67	M1DDD	92	KG4AKV
18	ON4AUC	43	AC0RA	68	VA3VGR	93	LW2DAF
19	KX9X	44	PR8KW	69	LU4JVE	94	HB9GWJ
20	KG5CCI	45	AA5PK	70	KI7UXT	95	KC7JPC
21	N5BO	46	JK2XXK	71	N4DCW	96	XE1ET
22	DJ8MS	47	EB1AO	72	PT9BM	97	AB5SS
23	ND0C	48	F4DXV	73	WA9JBQ	98	A41ZZ
24	K8BL	49	SP5XSD	74	VE3GOP	99	K4DCA
25	UT1FG	50	AD7DB	75	K0FFY	100	WN9Q

[ANS thanks @GridMasterMap for the above information]

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Two Line Elements or TLEs, often referred to as Keplerian elements or keps in the amateur community, are the inputs to the SGP4 standard mathematical model of spacecraft orbits used by most amateur tracking programs. Weekly updates are completely adequate for most amateur satellites. Elements in the TLE bulletin files are updated daily. TLE bulletin files are updated to add or remove satellites as necessary Thursday evenings around 2300 UTC, or more frequently if new high interest satellites are launched. More information may be found at https://www.amsat.org/keplerian-elements-resources/

This week there are no additions or deletions to the AMSAT TLE distribution.

[ANS thanks AMSAT Orbital Elements page for the above information]

ARISS NEWS

Amateurs and others around the world may listen in on contacts between amateurs operating in schools and allowing students to interact with astronauts and cosmonauts aboard the International Space Station. The downlink frequency on which to listen is 145.800 MHz worldwide.

+ Upcoming Contacts

Colegio Educación del Talento, Yerba Buena, Tucumán, Argentina, direct via LU5KHF
The ISS callsign is presently scheduled to be NA1SS
The scheduled crewmember is Andreas Mogensen KG5GCZ or Jasmin Moghbeli KI5WSL
The ARISS mentor is VE6JBJ
Contact is for: Mon 2023-09-25 15:08:45 UTC

Amur State University, Blagoveshchensk, Russia, direct via TBD
The ISS callsign is presently scheduled to be RSØISS
The scheduled crewmember is Oleg Kononenko
The ARISS mentor is RV3DR
Contact is for: Thu 2023-09-28 08:45 UTC

ARISS planned radio outage next week. In support of the Soyuz undocking planned for Wed. 9/27 the Voice Repeater & Digipeater will be off for the event.
Current Schedule:
Radios off: Tue. Sep. 26 about 12:20 UTC | 8:20 AM ET
Radios on: Thu. Sep. 28 about 07:45 UTC | 3:45 AM ET

The crossband repeater continues to be active (145.990 MHz up {PL 67} & 437.800 MHz down). If any crewmember is so inclined, all they have to do is pick up the microphone, raise the volume up, and talk on the crossband repeater. So give a listen, you just never know.

The packet system is also active (145.825 MHz up & down).

As always, if there is an EVA, a docking, or an undocking; the ARISS radios are turned off as part of the safety protocol.

Note, all times are approximate. It is recommended that you do your own orbital prediction or start listening about 10 minutes before the listed time.

The latest information on the operation mode can be found at
https://www.ariss.org/current-status-of-iss-stations.html

The latest list of frequencies in use can be found at https://www.ariss.org/contact-the-iss.html

[ANS thanks Charlie Sufana, AJ9N, one of the ARISS operation team mentors for the above information]

Upcoming Satellite Operations

K5Z will be active on IO-117 from DL88 on September 25-27. See the updated pass schedule at

https://www.qrz.com/db/KI0KB/P.

Doug, VA7LM will be active on IO-117 for the final time this year from CO44 on 24th September at 0102z.

A growing number of satellite rovers are currently engaged in sharing their grid square activations on https://hams.at. By visiting the website, you gain easy access to comprehensive information about the operators responsible for activating specific grid squares. Additionally, you have the ability to assess the match score between yourself and a particular rover for a given pass, while also being able to identify the upcoming satellite passes that are accessible from your location.

[ANS thanks Ian Parsons, K5ZM, AMSAT rover page manager, for the above information]

Hamfests, Conventions, Maker Faires, and Other Events

AMSAT Ambassadors provide presentations, demonstrate communicating through amateur satellites, and host information tables at club meetings, hamfests, conventions, maker faires, and other events.

+ ARRL Minnesota State Convention
October 14, 2023
Hennepin Technical College
9000 Brooklyn Blvd.
Brooklyn Park, Minnesota
http://mnconvention.org

+ 2023 AMSAT-UK Colloquium & RSGB Convention
October 14-15, 2023
Kents Hill Park Conference Centre
Milton Keynes MK7 6BZ, United Kingdom

+ 41st AMSAT Space Symposium & Annual General Meeting
October 20-21, 2023
Sheraton DFW Airport Hotel
4440 W John Carpenter Fwy, Irving, TX 75063

[ANS thanks AMSAT for the above information]

Satellite Shorts From All Over

+ Virgin Galactic successfully completed its third commercial suborbital spaceflight, known as "Galactic 03," on September 8, carrying three private astronauts. The VSS Unity spaceplane, attached to the VMS Eve mothership, took off from Spaceport America in New Mexico and reached an altitude of 88.6 kilometers before landing back at the spaceport. Unlike previous flights, the company kept the identities of the private astronauts secret until after the landing, revealing them as Ken Baxter, Timothy Nash, and Adrian Reynard. Virgin Galactic did not provide a webcast of the mission but updated the public via social media. The company plans to continue its monthly cadence of missions with "Galactic 04" in early October. [ANS thanks The Orbital Index for the above information.]

+ The Japan Aerospace Exploration Agency (JAXA) has announced an end of critical phases for two of its recently launched space missions. The Smart Lander for Investigating Moon (SLIM) has concluded its critical operation phase, demonstrating the normal functionality of its equipment through telemetry data. SLIM will now transition to an Earth orbit phase, where it will further test its onboard systems before embarking on its lunar journey. Simultaneously, the X-ray Imaging and Spectroscopy Mission (XRISM) also completed its critical phase, with normal operations in power generation, communication, and attitude control. XRISM is now entering a commissioning period to verify its onboard equipment's functions. These missions, launched on September 6, 2023, mark Japan's ambitious foray into lunar exploration with SLIM and its deep space investigations with XRISM, advancing our understanding of both the Moon and the universe. [ANS thanks the Japan Aerospace Exploration Agency for the above information.]

+ ESTCube-2 is set to launch aboard Vega C flight VV23 in the coming weeks, marking Europe's final

launch of 2023. This 3U CubeSat is a joint project between the Estonian Student Satellite Foundation and UT Tartu Observatory. It will test Coulomb drag propulsion, specifically E-sails, by using a positively charged wire to deflect solar wind protons and generate thrust. Additionally, it will experiment with a plasma brake to accelerate satellite deorbiting. ESTCube-2 will also conduct tests in low Earth orbit (LEO) on an electron emitter to prepare for future deep space missions. The mission includes Earth observation (EO) payloads and materials testing for LEO's atomic oxygen environment. The team is planning a lunar mission for actual E-sailing. The Vega C launch will carry a Thai EO satellite, a Taiwanese weather satellite, and various smallsats for diverse missions such as water monitoring, tech demonstrations, IoT, and more. [ANS thanks SpaceNews for the above information.]

+ NASA's OSIRIS-REx mission is gearing up for a historic moment on September 24, 2023, when it will return valuable samples from asteroid Bennu to Earth, with the landing scheduled for 10 a.m. EDT (1400Z) in Utah. Launched in 2016, the mission faced unexpected challenges as Bennu's surface differed from predictions, requiring reprogramming for a successful sample collection in 2020. Inside the descent capsule is a trove of precious asteroid material. As the spacecraft enters Earth's atmosphere at high speed, it will deploy parachutes to ensure a controlled landing. This event marks the culmination of OSIRIS-REx's 7-year mission, promising crucial insights into the solar system's history and composition. [ANS thanks Space.com for the above information.]

Join AMSAT today at https://launch.amsat.org/

In addition to regular membership, AMSAT offers membership to:

* Societies (a recognized group, clubs or organization).
* Primary and secondary school students are eligible for membership at one-half the standard yearly rate.
* Post-secondary school students enrolled in at least half-time status shall be eligible for the student rate for a maximum of 6 post-secondary years in this status.
* Memberships are available for annual and lifetime terms.

Contact info [at] amsat.org for additional membership information.

73 and remember to help Keep Amateur Radio in Space!

This week's ANS Editor, Mitch Ahrenstorff, ADØHJ
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